Small Business Innovation Research/Small Business Tech Transfer

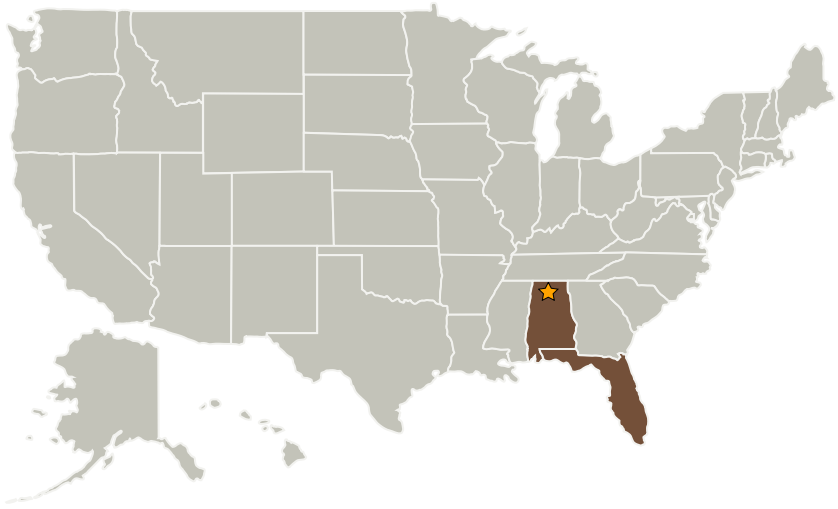
Development of an Anti-Vibration Controller for Magnetic Bearing Cooling Systems, Phase I

Completed Technology Project (2006 - 2006)

Project Introduction

This proposal outlines a program to develop a vibration-free reverse-Brayton cycle cooling system using specially-tuned magnetic bearings. Such a system is critical for the level of sensitivity required by future electromagnetic and gravitational wave detectors. The nature of magnetic bearings and their accompanying control systems make them ideal for applications that demand zero vibration, low-gravity, and maintenance-free operation. Further integration of these bearings into a reverse-Brayton cycle for cooling instruments is an ideal solution for use in high-sensitivity, long-term operations. In Phase I, Mainstream will develop a control algorithm designed to eliminate virtually all vibration and will be developed and tested on an existing machine operating under similar operating speeds and conditions. Design of the system and individual components will be finalized for immediate fabrication and testing in Phase II.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★Marshall Space Flight Center(MSFC)	Lead Organization	NASA Center	Huntsville, Alabama
Mainstream Engineering Corporation	Supporting Organization	Industry	Rockledge, Florida

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Marshall Space Flight Center (MSFC)

Responsible Program:

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Primary U.S. Work Locations	
Alabama	Florida

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
  - TX14.1 Cryogenic Systems
    - TX14.1.3 Thermal Conditioning for Sensors, Instruments, and High Efficiency Electric Motors